

**What is claimed is:**

1. In network environment including LAN and WAN a Content Distribution Master (CD Master) that is a contents synchronization system transmitting the modified contents of source data servers to target servers, said CD Master comprising a  
5 Content Distribution Master server (CD Master server), a Content Monitoring System server (CMS server), a Content Agent System server (CAS server), a Server Monitoring Agent server (SM Agent server), a Content Distribution Master Admin Tool (CD Master Admin Tool) and an authentic server, wherein

said CD Master server manages data distribution and data transmission and

  - 10 controls the service circumstances of said CMS server, CAS server, SM Agent server and monitors the data transmission status and the status of said CMS server, CAS server, SM Agent server, CD Master Admin Tool, authentic server;
  - 15 said CMS server monitors in real time at the operating system level whether the data of folders designated by a network manager are created, modified or deleted, and notifies the modified contents to said CD Master server;

said CAS server transmits data to other CAS servers or receives data from other CAS servers according to the instruction of said CD Master server;

said SM Agent server collects server status information about CPU, Memory, Session number of the installed CD Master server, CMS server, CAS  
20 server, CD Master Admin Tool, authentic server every constant time interval periodically and notifies the collected information to said CD Master server;

said CD Master Admin Tool of GUI (Graphic User Interface) environment being independent from operating system platform based on the development in

Java environment and is a management tool to support that said CD Master system manager sets CD Master service environment easily and provides intuitive interface and sets and confirms the service environments including service server management, environment setting between said CMS server and CAS server,

- 5 manager's account management, server status monitoring, scheduling, synchronization, server monitor agent setting, job log confirmation, operating environment setting through CD Master server; and

said authentic server is a license system of said contents synchronization system and issues and manages CD Master License Keys and classifies servers as 10 tree-structured three levels of Region, Group, Server for effective contents synchronization among servers grouped based on network topology being served actually, wherein Region is the highest level, Group is a medium level, and Server is a lowest level, and manages Region, Group, CAS server, CMS server and the restriction of the usable days for operating said synchronization system.

- 15 2. A contents synchronization system as set forth in claim 1, wherein it is characterized in that said CD Master performing:

a data filtering function that includes or excludes data and uses regular expression method, wherein the include helps said CD Master to make a manager specify the kind of data to transmit to target servers and only transmit a specific 20 kind of data to target servers, and the exclude helps CD Master to make a manager exclude a specific kind of data files from the transmission;

a multi contents generating function;

a multiple data transmission method function including real time

transmission, manual transmission, reserved transmission;  
a multi data transmission path setting function; and  
a data transmission fail-over function by network failure.

3. A contents synchronization system as set forth in claims 1 or 2, wherein it is  
5 characterized in that said CD Master comprising:
- a communication control unit controlling service environment of said CAS server, CMS server in order to centrally manage the real time distribution, manual distribution, reserved distribution of modified contents in networks and monitoring the status of said CD Master server in the path of contents transmission path and  
10 specifying the bypass in case of failure and controlling communication flow through the communication protocols with said CMS server, CAS servers, SM Agent servers, CD Master Admin Tool and authentication server;
- a contents transmission management unit controlling the distribution and management of information related to the real time distribution, manual distribution,  
15 reserved distribution of contents;
- a server fail over management unit controlling the specification of the bypass for contents synchronization among said CD Master server, CMS server, CAS server in case of failure of said CD Master server, CMS server, CAS server in routing path;
- 20 a real time server status monitoring management unit monitoring the status of CPU, memory, socket of source servers including said CMS server, CAS server and outputting the status of the source servers in the form of graph or table through the CD Master Admin user interface, and informing to a manager the status at once

if the status of CPU, memory, socket of the monitored servers is abnormal or the status value is above a predetermined critical value; and

a contents transmission job logging and statistical information management unit performing the real time synchronization, reserved synchronization or manual synchronization about the modified contents of said CMS server and recording and controlling the logging and statistical information about the synchronization results.

4. A contents synchronization system as set forth in claim 2, wherein it is characterized in that said multi contents generating function makes it possible for said CD Master to designate the synchronization timing of data diversely and to perform synchronization and backup of data by transmitting data in multiple source servers to all target servers and for every changed data of a specific data center to be transmitted to all target servers of another network center or another region, wherein in case N and M are arbitrary natural numbers, the transmission service is called as N:M type data transmission service.

15 5. A contents synchronization system as set forth in claim 2, wherein it is characterized in that said diverse data transmission function makes that in case data of source servers is changed, data synchronization timing of target servers is set as one of a real time transmission to transmit data at once to all target servers, a manual transmission for a manager to instruct transmission of data manually, and a reserved transmission to transmit data at a designated specific time or every regular time interval.

6. A contents synchronization system as set forth in claim 2, wherein it is characterized in that said diverse data transmission path setting function makes it

possible for said CD Master to have a manager set data transmission path flexibly according to network structure and status of said CAS server, CMS server and SM Agent server by making said CD Master use a grid network method and in case of data transmission each service server shortens the contents replication time by

- 5 allotting a role and reduces the burden of CPU and network of each service server up to the least and distributes load according to the hardware specification of each service server.

7. A contents synchronization system as set forth in claim 2, wherein it is characterized in that in case of network's failure, the data transmission fail-over

- 10 function makes it possible for said CD Master to transmit data via bypass by preparing for a case of no-transmission of data in a specific section and by monitoring the no-transmission, wherein it is checked whether the provided bypass belongs to the same Group, to the same Region or to an international Region among

Region, Group and Server of an existing structured network and data is transmitted

- 15 again from a nearest CAS server and in case data cannot be transmitted from every CAS server because of a fatal problem of a server, and the transmission is retried a predetermined times and if the result of transmission of the CAS server is fail, said

CD Master server performs contents synchronization for corresponding target servers according to the recovery procedure of preset target servers in case of failure

- 20 recovery of target servers in which the corresponding failure occurred and in the procedure it should be set selectively according to the circumstances whether contents synchronization should be performed at once after server's failure is recovered, or contents synchronization should be performed at a reserved time

which a manager designated, or contents synchronization of target servers having failure transmission should be performed manually

8. A contents synchronization system as set forth in claim 1, wherein it is characterized in that said CAS server comprises:

5        a Sync Client, a library performing functions of create, update, rename, delete, erase, move of files according to the command of said CAS server;

          a Sync Server, transmitting data to other CAS servers by performing one of create, update, rename, delete, erase and move of files or folders for monitoring directories detected by said CMS server according to the instructions of said CD

10      Master or receiving data from other CAS servers and storing remote files to local through communication according to the request of said remote Sync Client, which is an independent process from said CAS server internally;

          a routing table for the contents synchronization; and

          a CAS agent performing commands transmitted from said CD Master.

15      9. A contents synchronization system as set forth in claim 1, wherein it is characterized in that said CMS server comprises:

          a device driver at kernel level of operating system, notified information about directories and files to be monitored for creation, deletion, modification, movement of files and environment files about patterns of files to be monitored

20      from said CD Master server and notifying information about create, delete, modify, move of files and directories by in real time monitoring the change of the files and directories to said CD Master server in case files change in corresponding environment;

a CMS Agent for contents synchronization for defining original files and directories for that contents synchronization will be performed, synchronization patterns;

an environment setting file; and

5 a File Detect Buffer for storing created, deleted, modified, moved information by monitoring the modified contents in real time.

10. A contents synchronization system as set forth in claim 1, wherein it is characterized in that said SM Agent server notifies to a manager whether servers are normal or abnormal by using E-mail, SMS, Alarm functions when servers have  
10 physical failure or information about CPU, Memory, Session is above critical value by updating server information about CPU, Memory, Session number of servers in constant cycle

11. A contents synchronization system as set forth in claim 10, wherein it is characterized in that said server monitoring information is got by said SM Agent  
15 server and referenced in transmission for synchronization of said CD Master and if failure of a CAS server of contents synchronization path is monitored, said CD Master performs contents synchronization for other CAS servers except the corresponding CAS server and in case the corresponding CAS server, in which the failure has occurred is recovered later, then the synchronization is performed by a  
20 CAS server in neighboring other path and in case as a result of monitoring by said SM Agent server, server's physical problems or software problems including PING failure, failure of each PORT monitoring, Agent response failure, or load of CPU, Memory and Session are monitored, said CD Master server notifies the monitored

results to a manager through alarm information, SMS, E-mail by using CD Master Admin Tool and makes the manager check the status of servers and respond rapidly for failures.

12. A contents synchronization system as set forth in claim 1, wherein it is  
5 characterized in that

a management function of said service servers makes it possible through said CD Master Admin Tool that a network manager adds a server newly to be a service object of said CD Master and modifies and deletes the environments of existing registered servers;

10 an environment setting function of said CMS server and CAS servers makes it possible for said CMS server to set files and folders to be monitored and to set path to store data received from CAS servers installed in other servers;

a management function of said manager account creates, modifies, deletes the account and information of the manager with that the access to said CD Master  
15 Admin Tool is possible;

said server monitoring function shows the current status of registered service servers in forms of graph and table;

20 said work log confirmation function makes it possible to confirm all job log about all synchronization jobs, manual jobs, reserved jobs that are performed under control of said CD Master server; and

said management function is an application of GUI environment that can operate independently from platforms of operating system, and makes it possible to manage network easily and simply.

13. A contents synchronization system as set forth in claim 12, wherein it is characterized in that said CD Master Admin Tool sets environments related to communication environment of said CAS servers, original directories and mapping directories through environment setting function of said CAS servers.

5    14. A contents synchronization system as set forth in claim 1, wherein it is characterized in that said Group from the point of view of CD Master operation can perform optimal contents synchronization automatically or manually through designated contents routing path among grouped servers based on network topology, and classification by Region and Grouping among servers classify logically  
10 neighboring servers into a Group or a Region and the Grouping among servers makes it possible to perform synchronization effectively in same Groups or same Regions in case of contents synchronization according to the automatic or manual routing path and when several servers are combined by groups, although manual routing path is not provided, the effects of contents synchronization is maximized  
15 by designating optimal routing path.

15. A contents synchronization system as set forth in claim 1, wherein it is characterized in that said system keeps contents of all server groups identical with each other in order to provide services according to the objects for multiple server groups clustered through load balancer installed with switching facilities, wherein  
20 said server groups have the same objects.

16. In network environment including LAN and WAN a contents synchronization method using a contents synchronization system transmitting the modified contents of source servers to target servers, said system having a Content Distribution Master

server (CD Master server), a Content Monitoring System server (CMS server), several Content Agent System servers (CAS servers), a Server Monitoring Agent server (SM Agent server), a Content Distribution Master Admin Tool (CD Master Admin Tool) and an authentic server, said method comprising:

- 5        a step for setting the synchronization policy by the CD Master Admin Tool ;
  - a step for monitoring files and directories of a specific server in real time according to the set policy by the CMS server;
  - a step for checking by the CMS server whether there are creation, modification, deletion or move of contents as a result of the monitoring;
  - a step for performing said monitoring step again if there are no creation, modification, deletion or move of contents as a result of said check, but if there are creation, modification, deletion or move of contents, then notifying of the CMS server to the CD Master server in real time that there are creation, modification, deletion or move of contents;
  - a step for confirming by the CD Master server whether there is failure among the CD Master server, the CMS server, the CAS servers according to the contents routing path;
  - a step for selecting a predefined contents routing path if there are creation, modification, deletion or move of contents as a result of said confirmation;
  - a step for selecting a contents routing path by selecting a bypass if there are no creation, modification, deletion or move of contents as a result of said confirmation;
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- a step for instructing by the CD Master server a synchronization command to each CAS server to transmit said created, modified, deleted or moved contents to target servers;
- 5       a step for transmitting the corresponding contents to target servers according to designated path or bypass by the CAS server;
- a step for notifying the transmission results to the CD Master server by the CAS server after said transmittance;
- a step for confirming by the CD Master server whether there is a next contents routing path; and
- 10      a step for performing said step for confirming by the CD Master server whether there is failure among the CD Master server, the CMS server, the CAS servers again if there is next contents routing path but completing the contents synchronization if there is no next contents routing path as a result of said confirmation.
- 15      17. A contents synchronization method as set forth in claim 16, wherein it is characterized in that said method comprises further a step for issuing said license key by the authentication server, and said issuing step has steps for:
- setting license information through registration at Company/Site by a manager;
- 20      issuing Company/Site License Files to customers by the manager;
- issuing Install License File about License Key issued to customer;
- setting license information through registration at Company/Site by the manager; and

storing the Company/Site License Files received from the manager and the issued Install License Files in the CD Master server.

18. A contents synchronization method as set forth in claim 17, wherein it is characterized in that the verification about customer information and certificate information is performed by License key issued through the above process and operates the process of the CAS servers, CMS server and CD Master server and customers using a non-certificated license key has limit to operation of the normal process and cannot execute contents synchronization process.

19. A contents synchronization method as set forth in any one of claims 16 to 18, wherein it is characterized in that the operation of the CAS servers comprises:

a step for receiving jobs for synchronization by the CAS servers from the CD master server;

a step for confirming IP addresses of another CAS server or other CAS servers that would execute synchronization by searching the routing tables stored in the CAS servers by CAS Agents that received synchronization commands from the CD Master server;

a step for calling Sync Clients locating in CAS servers;

a step for executing create, update, rename, delete or move commands for synchronization in the CAS servers by the Sync Clients;

20 a step for transmitting the performance results of said transmitted jobs to the Sync Servers locating at a long distance;

a step for notifying the performance results of said transmitted jobs to CAS agent by local Sync Clients; and

a step for completing contents synchronization among all CAS servers by contents routing path and receiving the completed results of the synchronization jobs from each CAS server and transmitting the results to the CD Master server.

20. A contents synchronization method as set forth in any one of claims 16 to 18,  
5 wherein it is characterized in that

in case of data transmission among the CAS servers compressed data transmission function is performed and in case of contents synchronization the compressed data transmission function compresses and encodes data and reduces network's load,

10 said file transmission is specified in consideration of characteristics of network structure including International Region that does not belong to Same Region, Same Group,

15 in case of the file transmission the whole files are dump copied but in case of frequently updated files only the changed parts of files are transmitted after comparison of files, wherein the transmission method is called as different patch,

contents synchronization is performed by defining whether encryption is used or not by combination of AND conditions, or at the same time by specifying whether SSL encryption is used and whether dump copy or different patch is used,

20 the manager sets predetermined multi-level compression rates in consideration of network bandwidth of each transmission section,

the CD Master server supports packet encryption of transmission data using SSL and previously intercepts information leakage through hacking by using encryption function in order to protect important data and contents of enterprises

and persons, and

it is possible to define SSL encryption section selectively among the whole sections of source servers and target servers, wherein by reflecting network status of LAN and WAN sections to the maximum and setting, transmission rate increases  
5 and data is protected safely.

21. A contents synchronization method as set forth in any one of claims 16 to 18, wherein it is characterized in that a transmission algorithm for contents synchronization of the CAS servers comprises:

a step for transmitting Offsets of source files and list of 32-bit rolling  
10 checksum from a CAS server (hereafter called as CAS server A) to another CAS server (hereafter called as CAS server B) among several CAS servers, in case there exist similar files between CAS server A and CAS server B;

a step by CAS server B for comparing checksum of the corresponding index of said transmitted files by using hashing technique;

15 a step for only transmitting the corresponding indexes and changed parts to CAS server A by CAS server B if discordant parts are detected from results of said comparison, and

a step for only updating the discordant parts from CAS server A to CAS server B.

20 22. A contents synchronization method as set forth in any one of claims 16 to 18, wherein it is characterized in that operation procedure of the SM Agent server comprises:

a step for collecting information about CPU, Memory and Session that are

system resources of source servers;

a step for transmitting said collected information to the CD Master server;

a step for receiving said collected information by the CD Master server;

a step for constructing database from said received data;

5 a step for confirming whether servers are normal or not based on said  
collected information;

a step for reporting said confirmation results of servers to a manager  
through a predetermined method including an alarm, SMS and E-Mail;

10 a step for recognizing failure through the CD Master Admin Tool by the  
manager; and

a step for inspecting status of servers.